

- terminal, while the two terminals of the measure resistor are coupled in parallel connection with the two terminals formed by serial connection of the limit current resistor and photocoupler LED terminal; and
- 5      Protect circuit: the photocoupler's two collect-emitter terminals are formed in serial connection to couple with the up and down limit comparators; when the up and down limit comparators send out signals, HF power source is cut off.
- 10     2.      Per the measure device specified by Section 1 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.
- 15     3.      Per the measure device specified by Section 1 under the Scope of Claim, the measure resistor of the CCFL set may be Zener diode.
- 20     4.      Per the measure device specified by Section 1 under the Scope of Claim, the two terminals of the measure resistor of the CCFL set parallel connect to the AC terminal of a bridge rectifier; the bridge rectifier's DC positive terminal connects to the limit current resistor and photocoupler LED terminal, then connects to the bridge rectifier's DC negative terminal; the power source supplying to photocoupler LED terminal still comes from the two terminals of the measure resistor.
- 25     5.      Per the measure device specified by Section 4 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.
- 30     6.      Per the measure device specified by Section 4 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second Zener diodes; and the disposed directions of the first and the second Zener diodes are opposite.
7.      Per the measure device specified by Section 1 under the Scope of Claim, said measure device has two CCFL Clusters sharing a set of up

- and down limit comparators; within each CCFL Cluster, all lamps are connected at one end to share a measure resistor. After serial connecting the limit current resistor and the photocoupler, then coupled with the measure resistor's two terminals, the photocoupler's emitter terminal is joined with a diode, and the diode's N terminal and grounding resistor are connected to the positive and negative terminals of the up, down limit comparators, while the two sets of measure resistor and limit current resistors are interconnected.
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8. Per the measure device specified by Section 7 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.
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9. Per the measure device specified by Section 7 under the Scope of Claim, the measure resistor of the CCFL set may be Zener diode.
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10. Per the measure device specified by Section 7 under the Scope of Claim, the two terminals of the measure resistor of the CCFL set parallel connect to the AC terminal of a bridge rectifier; the bridge rectifier's DC positive terminal connects to the limit current resistor and photocoupler LED terminal, then connects to the bridge rectifier's DC negative terminal; the power source supplying to photocoupler LED terminal still comes from the two terminals of the measure resistor.
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11. Per the measure device specified by Section 10 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.
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12. Per the measure device specified by Section 10 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second Zener diodes; and the disposed directions of the first and the second Zener diodes are opposite.
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13. Per the measure device specified by Section 2 under the Scope of Claim, the photocoupler in the protect circuit is parallel connected; the

- collect-emitter terminal is coupled with negative resistor and diode, then connected to the up and down limit comparators, so that when the up and down limit comparators send out signals, HF power source is cut off.
- 5        14. Per the measure device specified by Section 13 under the Scope of Claim; the first and the second diode clusters of the CCFL set may be replaced by a single diode, and may eliminate HV limit current resistor.
15. Per the measure device specified by Section 4 under the Scope of Claim, two CCFL sets share a bridge rectifier; the bridge rectifier's DC terminals are connected to the measure resistor; the bridge rectifier's DC positive terminal connects to the limit current resistor and photocoupler LED terminal, then connects to the bridge rectifier's DC negative terminal; the power source supplying to photocoupler LED terminal still comes from the two terminals of the measure resistor; the protect circuit's photocoupler may be single or multiple.
- 10        16. Per the measure device specified by Section 15 under the Scope of Claim, the protect circuit's photocoupler is parallel connected, then connects to the up and down limit comparators, so that when the up and down limit comparators send out signals, HF power source is cut off.
- 15        17. A type of measure device per any specification from Section 1 through 16 under the Scope of Claim, wherein the high frequency power source circuit is full-bridge type electronic ballast.
- 20        18. A type of measure device per any specification from Section 1 through 16 under the Scope of Claim, wherein the high frequency power source circuit is half-bridge type electronic ballast.
- 25        19. A type of measure device per any specification from Section 1 through 16 under the Scope of Claim, wherein the protect circuit's up, down limit comparator may be differential amplifier integrated circuit.
- 30        20. A type of measure device per any specification from Section 1 through 16 under the Scope of Claim, wherein the protect circuit's up, down limit comparator may be digital comparator integrated circuit.
21. A type of protective device for cold cathode fluorescent lamp (CCFL), which comprises:

CCFL set: consists of HF HV capacitor, cold cathode fluorescent lamps,

- measure resistor, limit current resistor and photocoupler primary; multiple CCFL sets are joined together by parallel connection to form a CCFL Cluster. To accommodate backlighting required by large LCD monitors, multiple clusters may be conjoined, characterised by serial connection of HV capacitors and cold cathode fluorescent lamps and measure resistors; the two terminals are connected to HF HV terminal, while the two terminals of the measure resistor are coupled in parallel connection with the two terminals formed by serial connection of the limit current resistor and photocoupler LED terminal; and
- Protect circuit: the photocoupler's two collect-emitter terminals are formed in serial connection to couple with the up and down limit comparators; when the up and down limit comparators send out signals, HF power source is cut off.
- 15    22. Per the protective device specified by Section 21 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.
- 20    23. Per the protective device specified by Section 21 under the Scope of Claim, the CCFL set's measure resistor may be Zener diode.
24. Per the protective device specified by Section 21 under the Scope of Claim, the two terminals of the measure resistor of the CCFL set parallel connect to the AC terminal of a bridge rectifier; the bridge rectifier's DC positive terminal connects to the limit current resistor and photocoupler LED terminal, then connects to the bridge rectifier's DC negative terminal; the power source supplying to photocoupler LED terminal still comes from the two terminals of the measure resistor.
- 25    25. Per the protective device specified by Section 24 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.

26. Per the protective device specified by Section 24 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second Zener diodes; and the disposed directions of the first and the second Zener diodes are opposite.
- 5      27. Per the protective device specified by Section 21 under the Scope of Claim, two CCFL sets share a set of up and down limit comparators; within each CCFL Cluster, all lamps are connected at one end to share a measure resistor. After serial connecting the limit current resistor and the photocoupler, then coupled with the measure resistor's two terminals, the photocoupler's emitter terminal is joined with a diode, and the diode's N terminal and grounding resistor are connected to the positive and negative terminals of the up, down limit comparators, while the two sets of measure resistor and limit current resistors are interconnected.
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- 15      28. Per the protective device specified by Section 27 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.
- 20      29. Per the protective device specified by Section 27 under the Scope of Claim, the CCFL set's measure resistor may be Zener diode.
30. Per the protective device specified by Section 27 under the Scope of Claim, the two terminals of the measure resistor of the CCFL set parallel connect to the AC terminal of a bridge rectifier; the bridge rectifier's DC positive terminal connects to the limit current resistor and photocoupler LED terminal, then connects to the bridge rectifier's DC negative terminal; the power source supplying to photocoupler LED terminal still comes from the two terminals of the measure resistor.
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- 30      31. Per the protective device specified by Section 30 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second diode clusters; while the first and second diode clusters may consists of one or multiple diodes, and that the disposed directions of the first and the second diode clusters are opposite.

32. Per the protective device specified by Section 30 under the Scope of Claim, the measure resistor of the CCFL set may be the first and second Zener diodes; and the disposed directions of the first and the second Zener diodes are opposite.
- 5      33. Per the protective device specified by Section 21 under the Scope of Claim, two CCFL or even numbers of CCFL Clusters share a set of up and down limit comparators; within each CCFL Cluster, all lamps are connected at one end to share a measure resistor. After serial connecting the limit current resistor with variable resistor and the photocoupler LED, then coupled with the measure resistor's two terminals, the variable resistor's mid point terminal is coupled with one end of the measure resistor, the photocoupler's emitter terminal is grounded, and the collect-emitter terminal connected to the up and down limit comparators.
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- 15      34. Per the protective device specified by Section 21 under the Scope of Claim, two CCFL or even numbers of CCFL Clusters share a set of up and down limit comparators; within each CCFL Cluster, all lamps are connected at one end to share a measure resistor. After serial connecting the limit current resistor with variable resistor and the photocoupler LED, then coupled with the two terminals formed by serial connection of the measure resistor and the variable resistor, the variable resistor's mid point terminal is coupled with the middle of two limit current resistors, the photocoupler's emitter terminal is grounded, and the collect-emitter terminal connected to the up and down limit comparators
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35. Per the protective device specified by Section 22 under the Scope of Claim, the protect circuit's photocoupler is parallel connected, the collect-emitter terminal couples with negative resistor and diode, then connects to the up and down limit comparators, so that when the up and down limit comparators send out signals, HF power source is cut off.
36. Per the protective device specified by Section 35 under the Scope of Claim, the first and second diode clusters of the CCFL set may be replaced by a diode, and may eliminate HV limit current resistor.
37. Per the protective device specified by Section 24 under the Scope of

- Claim, two CCFL sets share a bridge rectifier; the bridge rectifier's DC terminals are connected to the measure resistor; the bridge rectifier's DC positive terminal connects to the limit current resistor and photocoupler LED terminal, then connects to the bridge rectifier's DC negative terminal; the power source supplying to photocoupler LED terminal still comes from the two terminals of the measure resistor; the protect circuit's photocoupler may be single or multiple.
- 5           38. Per the protective device specified by Section 37 under the Scope of Claim, the protect circuit's photocoupler is joined in parallel connection to the up and down limit comparators, so that when the up and down limit comparators send out signals, HF power source is cut off.
- 10          39. A type of measure device per any specification from Section 21 through 38 under the Scope of Claim, wherein the protect circuit's up, down limit comparator may be differential amplifier integrated circuit.
- 15          40. A type of measure device per any specification from Section 21 through 38 under the Scope of Claim, wherein the protect circuit's up, down limit comparator may be digital comparator integrated circuit.